

DOCUMENT RESUME

ED 228 634

CS 007 099

AUTHOR Finch, Carolyn M.
TITLE Fifth Grade Below Average and Above Average Readers' Use of Mental Imagery in Reading Familiar and Unfamiliar Text.
PUB DATE Dec 82
NOTE 19p.; Paper presented at the Annual Meeting of the National Reading Conference (32nd, Clearwater Beach, FL, December 1-4, 1982).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Academic Aptitude; *Cognitive Processes; Discourse Analysis; Grade 5; Intermediate Grades; Prior Learning; *Reading Comprehension; *Reading Instruction; Reading Materials; *Reading Research; Reading Skills; *Visualization
IDENTIFIERS *Induced Mental Imagery; *Reading Strategies

ABSTRACT

A study investigated the ability of fifth grade above and below average readers to use mental imagery in reading familiar and unfamiliar text. The subjects, 80 fifth grade students reading either above or below grade level, were placed into either an experimental or a control group. All subjects individually read one familiar and one unfamiliar passage, completing a free recall and a cued recall test after each. Subjects in the experimental group were told to form pictures in their heads as a way of remembering what they had read, while those in the control group were told simply to remember what they had read. Results indicated significant differences between the experimental and control groups, but only on the cued recall test. There were also significant differences between the above average and below average readers and between students' scores on the different texts in favor of familiar text. Students' responses in the control group to a brief questionnaire revealed that 90% of the above average readers and 65% of the below average readers spontaneously used mental imagery while reading. All students in the experimental group reported effectively inducing mental imagery during reading. (FL)

* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION
CENTER (ERIC)

X This document has been reproduced as
received from the person or organization
originating it.

Minor changes have been made to improve
reproduction quality.

• Points of view or opinions stated in this docu-
ment do not necessarily represent official NIE
position or policy.

Fifth Grade Below Average and Above Average
Readers' Use of Mental Imagery
in Reading Familiar and Unfamiliar Text

Paper Presented

at

*The Annual Meeting of the National Reading
Conference (32nd), Clearwater Beach,
Florida (December 1-4, 1982)*

"PERMISSION TO REPRODUCE THIS
MATERIAL HAS BEEN GRANTED BY

Carolyn M. Finch

TO THE EDUCATIONAL RESOURCES
INFORMATION CENTER (ERIC)."

CAROLYN M. FINCH
BOWIE STATE COLLEGE
BOWIE, MARYLAND 20715

ED228634

CS 007 099

FIFTH GRADE BELOW AVERAGE AND ABOVE AVERAGE
READERS' USE OF MENTAL IMAGERY
IN READING FAMILIAR AND UNFAMILIAR TEXT

According to Levin (1976), most learning situations are "less than optimally structured" (p. 114). Most require that learners engage in elaborate mental transformations in order to process material effectively. This requires the use of organizational strategies.

Smith (1978) discusses the use of organizational strategies and their effect upon reading comprehension. A common means of organizing information into compact and meaningful units, he notes, "is to employ imagery to remember" (p. 208). Additional literature tends to support the fact that recall of highly concrete text is related to scenes that are imagined from the descriptions provided by the words in the text.

Paivio (1971) clearly documents the effectiveness of a mental imagery strategy on a wide variety of memory tasks. He found that forming mental images facilitates recall by furnishing the learner with a meaningful representation of material being studied. Other researchers have found that mental imagery effectively aids memory of paired-associates (Rohwer & Ammons, 1971). Indeed, an abundance of data is available that indicates that mental imagery facilitates learning of concrete information represented as single word referents (Pressley, 1977). These studies have dealt with items not bound together by the inherent organization found in prose. The readers,

including children as young as seven years, effectively use mental imagery to apply their own organization and relational structure to words and phrases.

Although few in number, additional studies provide some evidence to support the utilization of a mental imagery strategy in prose learning (Pressley, 1977). These experiments, in particular, are noteworthy because subjects who are given formal instructions to generate mental images, successfully use the strategy to integrate what is being learned. Several studies have revealed that adults who use imagery remember more of the content of a prose passage than adults who do not (Anderson & Hidde, 1971; Anderson & Kulhavy, 1972). Studies have also shown that, under some circumstances, children show improved memory of prose when instructed to form mental images of what they read (Levin, 1973; Levin & Divine-Hawkins, 1974; Levin, Divine-Hawkins, Kerst, & Guttman, 1974). Although gains are often small, or statistically insignificant in these studies, a mental imagery strategy, it seems, serves to increase the degree to which subjects remember the meaning of text, as well as rote verbatim components.

Because the use of a mental imagery strategy frequently, but often minimally, facilitates prose learning, questions remain as to the generalizability of the strategy to connected discourse or prose. It seems that greater consideration must be given to the qualities of text, as well as characteristics of readers if a clear understanding is to be forthcoming. While researchers have clearly documented the importance of concreteness as a feature of text (Levin, 1976), they are just beginning to look at other variables such as text structure

(Steingart & Glock, 1979). While there is some evidence that a subject's age, sex, and reading ability are important variables, little consideration has been given to the effects of prior knowledge. This study was designed to determine if a subject's prior knowledge of topics presented in written prose is an important variable when employing a mental imagery strategy in reading prose. That is, does the strategy seem to be more effective as a comprehension aid when subjects read about familiar topics (topics about which they have prior knowledge), or when subjects read unfamiliar or novel text? A related purpose was to gain information about the relative benefits of a mental imagery strategy with different reader types.

METHOD

SUBJECTS

Eighty fifth grade above average and below average readers enrolled in six suburban Maryland public schools served as subjects in the study. The following criteria were used for classification of above average and below average readers:

- (1) Percentile scores on the comprehension subtest of the California Achievement Test (below average reading scores between the 4th and 40th percentile; above average test scores between the 61st and 96th percentiles.)
- (2) Cognitive Abilities Test scores within 1 standard deviation above or below the mean.
- (3) Teacher verification of subject identification as an above average or below average reader.

MATERIALS

Training Materials

The training materials, similar to those prepared by Pressley (1976), consisted of the following:

- (1) two sentences which contained two major elements.
(The fat puppy chased the cat.)
- (2) four sentences which contained three major elements.
(The tall man stood next to a fence eating popcorn.)
- (3) one short paragraph approximately 40 words long, and part of a short story.

All training materials consisted of selections that referred to very concrete items and events. The short story was 100 words in length and written on a second grade level. It was divided into three meaningful sections, typed on three pages, and bound into a booklet so that each typed page was followed by a blank page. The blank page was included to encourage students to form mental images, not while reading, but immediately afterwards.

Prose Passages

Four prose passages were written for use in this study, two passages on familiar topics and two passages on unfamiliar topics. (Preliminary piloting was done to verify familiarity of topics and ease of readability.) The two familiar passages were entitled Baby Birds and A Day at Blister Beach. Comparable unfamiliar passages were entitled Baby Lems (strange, imaginary animals) and A Day in the Misty Underground (an unusual, imaginary place). Comparability of familiar and unfamiliar passages in regard to main ideas and details, paragraph and sentence structure, and story development was achieved.

In addition, the passages were highly concrete and conducive to visualizing. The four passages were each approximately 200 words in length. They had a readability level of second grade as determined by Fry's Readability Graph (Fry, 1968), so as to be lower than the instructional reading level of the below average readers.

Each reading selection was divided into five meaningful sections, typed on five pages, and bound into a booklet so that each typed page was followed by a blank page. This was done to encourage subjects to induce mental imagery following the silent reading, not during reading.

Procedure

In the study, each subject individually read one familiar and one unfamiliar passage and completed a free recall and a cued recall test after reading each passage. The selections and the order of reading were counterbalanced. Approximately 25 minutes was needed for testing each subject.

Experimental Group. The subject was told, "a good way to remember things is to make up pictures in your head." The subject was instructed to listen to several sentences and to "make up pictures in your head of the sentence." After each sentence, the investigator asked the subject to describe his/her mental pictures. The accuracy and completeness of the mental images were discussed. The procedure was repeated with a short paragraph. Then, the investigator gave the subject the practice story. The subject was instructed to silently read the first page, turn to the subsequent blank page and "make pictures in your head to help you remember." Following the reading of the practice story, the subject orally retold the story and answered questions about the story.

Immediately following the brief training exercise, the subject silently read one familiar and one unfamiliar passage. Prior to reading, the subject was told to construct mental images to help him/her remember the story. Reminders to form mental images were repeated after the student read the third page of each selection. Immediately after reading each passage, the student responded to a brief interview about the use of mental imagery. This interview had two purposes: to provide an intervening task that would eliminate the effects of short term memory, and to provide evidence of the student's ability to use mental imagery during reading.

After the short interview, the student was asked to orally retell the story. (All retellings were taped.) The student, then, orally answered a set of comprehension questions. For each passage, the investigator first asked five interpretive questions, followed by five literal questions. Student responses were recorded by the investigator on an answer sheet.

Control Group. The students in this group were presented with the same training materials. The experimenter told the student to "try to remember the sentences." The student was instructed to recall the item, and the accuracy of recall was discussed.

After training, the student silently read one familiar and one unfamiliar passage in the pattern previously established. Prior to reading, the student was told to "try to remember what you read." (Writing and drawing were not allowed.) These instructions were repeated after the student read the third page of each passage. Immediately after reading each passage, the student responded to a brief interview about the use of mental imagery. This interview had two purposes: to provide an intervening task that would eliminate

the effects of short term memory, and to determine if the student spontaneously used mental imagery while reading. Post testing for this group also consisted of a free recall test and a cued recall test.

RESULTS

Two independent raters divided the four passages into propositions using a modification of Spencer's (1973) propositional analysis procedure. Interrater reliability for the passages was .99 overall. Twenty of the subjects' free recall protocols were scored by the two independent raters (interrater reliability = .98). The remaining 140 free recall protocols were randomly assigned to the two independent scorers so that each rater scored 70 of the remaining protocols.

A repeated measures analysis of variance was performed separately on cued recall and free recall data. For all analyses, the conventional level of significance, .05, was used. The mean number of correct answers for the cued recall and free recall tests obtained from control and experimental groups can be found in Tables 1 and 2.

The results of the analysis showed that there were significant differences between the group that received mental imagery instructions and the control group, but only on the cued test. There were also significant overall differences between the above average and below average readers, and between students' scores on the different texts in favor of familiar text. Students' responses in the control group to a brief questionnaire revealed that 90% of the above average readers and 65% of the below average readers spontaneously used mental imagery during reading. All students in the experimental group reported that they effectively induced mental imagery during reading.

Discussion

Major Findings

As most of the research demonstrates, consistent positive effects have not been obtained with the use of a mental imagery strategy on prose learning tasks. Pressley (1976) notes that few attempts to provide children with instruction in the use of mental imagery have yielded overly impressive results. When positive effects occur, they are often small and limited in generality. The results found in this study are similar to some of the other research findings in this area.

Support was found for the positive benefits of an induced mental imagery strategy on familiar and unfamiliar text, but only on the cued test. And, the effects of the strategy, as measured by the cued test, do not appear to be large. It can also be noted that the strategy does not seem to be better suited for either familiar or unfamiliar text. And, while both above average and below average readers seemed to make small gains when given instructions to induce mental imagery, the strategy was not more effective for below average readers.

The findings in this study may be attributed to several factors. One factor that certainly influenced the results was the fact that the majority of the students in the control group (above average and below average readers) reported that they spontaneously used mental imagery while reading the prose passages. Levin and Divine-Hawkins (1974) and Pressley (1976) report that this often is the case in mental imagery studies, particularly with above average readers. Therefore, it is difficult to know how and to what extent the experimental group benefited from instructions to induce mental imagery. The adoption of a strategy by the control group would naturally minimize the effects due to instruction.

9

The amount of imagery training that the subjects received may be another factor that could account for the results in this study. If some readers can benefit from a mental imagery strategy, perhaps more extensive training in the use of mental imagery is needed to produce consistent positive results.

Another factor that may have influenced the results may be the various levels of intensity with which the strategy was applied by individual subjects. Levin and Pressley (1981) comment that whether or not a particular strategy realizes its potential depends on many situational factors, including prose characteristics and processor characteristics. Prose-learning strategies of the processor variety will not fulfill their promise unless dedication and hard work are employed by the user. Levin and Pressley go on to state that . . . "simply instructing a less proficient prose learner to adopt a strategy spontaneously applied by a more proficient prose learner will not always be sufficient to effect a comprehension increase" (p. 67).

The lack of impressive results with the utilization of a mental imagery strategy in this study may have us investigate more closely questions like when and with whom is the strategy effective. Effective prose strategies also require clever delivery on the part of the instructor, including the matching of strategies to materials and students.

Additional insight may be gained from a recent report by Levin (1981) who singled out the "mental image" itself as the key variable in research studies testing the relative effects of a mental imagery strategy in prose learning. In an analysis of illustrations versus mental images, Levin describes two functions of pictures and mental images in prose learning. At times, pictures and mental images may

be used as literal representations of text. That is, they act as exact representations of concrete prose passages. At other times, pictures and mental images function as transformations of text. In these instances, the pictures and mental images transform information that is only weakly connected into more memorable representations. Subjects in this study formed representational mental images, and thus, did not consistently perform better than subjects in the control group. Explicit visual imagery instructions seem not to promote much effective processing beyond that which students normally do.

Related Findings

The finding of significant differences between students' scores on familiar and unfamiliar text was not surprising. On familiar text students were able to effectively use information and make predictions about text. They could actively construct meaning for text through the use of their memory of prior events and experiences. Wittrock (1981) describes the reading process as the act of generating meaning for text by constructing relations between the reader's knowledge, his memories of experiences, and the text. As Wittrock (1981) notes, . . . "the generation of literal or inferential meanings for written language involves the reader's organized knowledge and memories of experience" (p. 230). The finding that both above average and below average readers had higher levels of comprehension on familiar text complements the research of Taylor (1979) who found that both above average and below average readers seem to engage in knowledge-based processing when reading relatively easy text on a familiar topic.

Significant differences between readers demonstrated in this study also substantiated the long held distinctions that are accepted

by researchers. Good comprehenders read for meaning while poor comprehenders are more concerned with decoding words and fail to see the relationships between words that could speed up decoding and enhance comprehension. (Golinkoff, 1975-1976)

Table 1
Means and Standard Deviations of Number of Correct
Answers to Cued Test Questions on Familiar
and Unfamiliar Text

Correct Answers	Experimental n=40		Control n=40	
	Familiar	Unfamiliar	Familiar	Unfamiliar
Above Average Reader				
M	8.4500	7.3000	7.8000	7.0500
SD	1.4133	1.2688	1.3266	2.7744
Below Average Reader				
M	7.0500	5.9500	6.2000	4.2500
SD	2.8456	1.3955	1.4177	1.4097

Table 2
Means and Standard Deviations of Free Recall Scores
for Propositions on Familiar and Unfamiliar Text

Correct Answers	Experimental n=40		Control n=40	
	Familiar	Unfamiliar	Familiar	Unfamiliar
Above Average Reader				
M	55.2500	50.7500	55.6500	56.0000
SD	10.7790	13.4420	16.7936	12.6253
Below Average Reader				
M	47.0000	38.6000	43.5500	31.3500
SD	9.5157	14.3610	13.4739	14.5783

REFERENCES

- Anderson, R. C., & Hidde, J. L. Imagery and sentence learning. Journal of Educational Psychology, 1971, 62, 526-530.
- Anderson, R. C., & Kulhavy, R. W. Imagery and prose learning. Journal of Educational Psychology, 1972, 63, 242-243.
- Fry, E. B. A readability formula that saves time. Journal of Reading, 1968, 11, 513-516, 575-578.
- Golinkoff, R. M. A comparison of reading comprehension processes in good and poor comprehenders. Reading Research Quarterly, 1975-1976, 11, 623-660.
- Levin, J. R. Inducing comprehension in poor readers: A test of a recent model. Journal of Educational Psychology, 1973, 6, 23-30.
- Levin, J. R. On functions of pictures in prose. In F. J. Pirozzolo & M. C. Wittrock (Eds.), Neuropsychological and Cognitive Processes in Reading. New York: Academic Press, 1981.
- Levin, J. R. What have we learned about maximizing what children learn? In J. R. Levin & V. L. Allen (Eds.), Cognitive Learning in Children. New York: Academic Press, 1976.
- Levin, J. R., & Divine-Hawkins, P. Visual imagery as a prose learning process. Journal of Reading Behavior, 1974, 6, 23-30.
- Levin, J. R., Divine-Hawkins, P., Kerst, S. M., & Guttman, J. Individual differences in learning from pictures and words: The development & application of an instrument. Journal of Educational Psychology, 1974, 66, 296-303.
- Levin, J. R., & Pressley, M. Improving children's prose comprehension: Selected strategies that seem to succeed. In C. M. Santa & B. L. Hayes (Eds.), Children's Prose Comprehension. Newark, Delaware: International Reading Association, 1981.

- Paivio, A. Imagery and Verbal Processes. New York: Holt, Rinehart & Winston, Inc., 1971.
- Pressley, M. Imagery and children's learning: Putting the picture in developmental perspective. Review of Educational Research, 1977, 47, 585-622.
- Pressley, M. Mental imagery helps eight-year olds remember what they read. Journal of Educational Psychology, 1976, 68, 355-359.
- Rohwer, W. D., & Ammons, M. S. Elaboration training and paired-associate learning efficiency in children. Journal of Educational Psychology, 1971, 62, 376-383.
- Smith, F. Understanding Reading. New York: Holt, Rinehart & Winston, 1978.
- Spencer, N. J. Changes in representation and memory. A doctoral dissertation. University of Pennsylvania, 1973.
- Steingart, S. K., & Glock, M. D. Imagery and the recall of connected discourse. Reading Research Quarterly, 1979, 15, 66-83.
- Taylor, M. M. Good and poor readers' recall of familiar and unfamiliar text. Journal of Reading Behavior, 1979, 11, 375-380.
- Wittrock, M. C. Reading comprehension. In F. J. Pirozzolo & M. C. Wittrock (Eds.), Neuropsychological and Cognitive Processes in Reading. New York: Academic Press, 1981.